EVALUATION OF PORTFOLIO PERFORMANCE OF TURKISH INVESTMENT FUNDS

Cudi Tuncer GÜRSOY
Doğuş University

Y. Ömer ERZURUMLU
Doğuş University

ABSTRACT: This article attempts to measure performances of Type A and Type B funds relative to T-Bill rates and ISE-100 index in Turkey over the period of January 1998-June 2000 using Sharpe, Treynor, Jensen, and Graham&Harvey indices. 55 Type A, and 77 Type B Funds were included in the analysis. In order to test whether four different indices make similar ranking, Spearman rank correlation analysis was utilized. Secondly, Wilcoxon Signed-Rank test was applied to test the significance of the differences in Sharpe indices of alternative investment instruments included in the analysis.

Analysis revealed that different criteria rank the portfolios similarly. But more importantly it was found that, the best investment over the entire analysis period as well as in the sub-periods was T-Bills, which was followed by ISE-100 index, Type B Funds, and Type A funds respectively. This finding makes the merits of the efforts spent by funds managers, over the analysis period, to outperform the market highly questionable.

Key Words: *Type A Funds, Type B Funds, Portfolio performance, Sharpe Index, Treynor Index, Jensen Criterion, Graham&Harvey Criterion , Portfolio Ranking*

ÖZET: Bu makale A ve B tipi fonların 1998 Ocak-2000 Haziran dönemindeki performanslarını, Sharpe, Treynor, Jensen ve Graham&Harvey kriterlerini kullanarak Hazine bonosu ve İMKB-100 indeksine kıyasla ölçümlemeyi amaçlamaktadır. Analize 55 A Tipi, 77 B tipi fon dahil edilmiştir. Bu kriterlerin fonları aynı şekilde sıralayıp sıralamadığını görmek için Spearman dizi korelasyonundan yararlanılmıştır. İkinci olarak, dört farklı yatırım aracının ortalama Sharp katsayılarının birbirinden anlamlı ölçüde farklı olup olmadığı Wilcoxon İşaretli Sıra testiyle irdelenmiştir.

Yapılan analizler portföy performansını değerlendirmede kullanılan dört kriterin fonları benzer şekilde sıraya koyduğunu göstermiştir. Ama daha önemlisi, gerek tüm analiz döneminde gerekse alt dönemlerde hazine bonosunun en iyi yatırım aracı olduğu, onu sırasıyla İMKB-100 endeksi, B Tipi fon ve A Tipi fonun izlediği görülmüştür. Bu sonuç, fon yöneticilerinin, analiz dönemi boyunca, pazar ortalamasından daha iyi fonlar oluşturma çabalarının yararı konusunda kuşku yaratmaktadır.

Anahtar Kelimeler: *A Tipi Fon, B Tipi Fon, Fon performansı, Sharpe indeksi, Treynor indeksi, Jensen kriteri, Graham&Harvey kriteri, Portföy sıralaması*

I. INTRODUCTION

This paper aims at :

a) measuring portfolio performance of Type-A and Type-B investment funds in Turkey with alternative indices over the period of January 1, 1998 – June 30, 2000,

b) testing whether alternative evaluation criteria give similar results,

c) comparing portfolio performances of Type A and Type B funds with those of T-Bills , and ISE-100 in order to see the significance of the differences over the same period.

Before 1960, investors evaluated portfolio performance almost entirely on the rate of return, although they knew that risk was a very important variable in determining investment success. The reason for omitting risk was the lack of knowledge how to measure and quantify it. After the development of portfolio theory in early 60s, and CAPM in subsequent years, risk, measured as either by standard deviation or beta, was included in evaluation process. However, since there was not a single measure combining both return and risk, two factors were to be considered separately: Researchers grouped portfolios into similar risk classes and compared rates of return of portfolios in the same risk class.

Treynor (1965) was the first researcher developing a composite measure of portfolio performance. He measures portfolio risk with beta, and calculates portfolio's market risk premium relative to its beta:

$$T_i = (R_p - R_f) / \beta_p \qquad (1)$$

Where:

T_i = Treynor's performance index

R_p = Portfolio's actual return during a specified time period

R_f = Risk-free rate of return during the same period

β_p = beta of the portfolio

Whenever $R_p > R_f$ and $\beta_p > 0$ a larger T value means a better portfolio for all investors regardless of their individual risk preferences. In two cases we may have a negative T value: when $R_p < R_f$ or when $\beta_p < 0$. If T is negative because $R_p < R_f$, we judge the portfolio performance as very poor. However, if the negativity of T comes from a negative beta, fund's performance is superb. Finally when $R_p - R_f$, and β_p are both negative, T will be positive, but in order to qualify the fund's performance as good or bad we should see whether R_p is above or below the security market line pertaining to the analysis period (Reilly, 1992).

Sharpe (1966) developed a composite index which is very similar to the Treynor measure, the only difference being the use of standard deviation, instead of beta, to measure the portfolio risk:

$$S_i = (R_p - R_f) / \sigma_p \quad (2)$$

Where:

S_i = Sharpe performance index

σ_p = Portfolio standard deviation

This formula suggests that Sharpe prefers to compare portfolios to the capital market line(CML) rather than the security market line(SML). Sharpe index, therefore, evaluates funds performance based on both rate of return and diversification (Sharpe 1967). For a completely diversified portfolio Treynor and Sharpe indices would give identical rankings.

Jensen (1968), on the other hand, writes the following formula in terms of realized rates of return, assuming that CAPM is empirically valid:

$$R_{jt} = R_f + \beta_j (R_m - R_f) + u_{jt}$$

Subtracting R_f from both side he obtains:

$$R_{jt} - R_f = \beta_j (R_m - R_f) + u_{jt}$$

This formula says that risk premium earned on j^{th} portfolio is equal to the market risk premium times β_j plus a random error term. In this form, one would not expect an intercept for the regression equation, if all securities are in equilibrium. But if certain superior portfolio managers can persistently earn positive risk premiums on their portfolios, the error term u_{jt} will always have a positive value. In such a case, an intercept value which measures positive differences from the model must be included in the equation as follows:

$$R_{jt} - R_f = \alpha_j + \beta_j (R_m - R_f) + u_{jt}$$

Jensen uses α_j as his performance measure. A superior portfolio manager would have a significant positive α_j value because of the consistent positive residuals. Inferior managers, on the other hand, would have a significant negative α_j. Average portfolio managers having no forecasting ability but, still, cannot be considered inferior would earn as much as one could expect on the basis of the CAPM. The residual terms would randomly be positive and negative, and this would give an intercept value which is insignificantly different from zero.

Jensen performance criterion, like the Treynor measure, does not evaluate the ability of portfolio managers to diversify, since the risk premiums are calculated in terms of β.

Graham & Harvey (1997) recently suggested that performance of a portfolio should be measured by its excess return over the return of a "market index/risk-free-asset combination" with a standard deviation equal to that of the portfolio. Therefore, if the standard deviation of a portfolio is different from the market standard deviation, the latter must be increased or decreased to the level of portfolio standard deviation by forming an appropriate combination of market index and risk-free-asset. Assuming a market return of 15 %, with a standard deviation of 20 %; a portfolio return of 25 % with a standard deviation 40 %, and a risk-free rate of 10 %, Graham&Harvey would make 100 % levered portfolio of which standard deviation is also 40 % (-1 * 0 + 2 * 0.2) . Since the return of this combination would be 20 % (2*0.15 – 1* 0.10) , excess return of the portfolio would be measured as 5 % (25 % - 20 %) . The higher the excess return, the better the portfolio performance.

II. EVALUATION OF TYPE A AND TYPE B FUNDS IN TURKEY

2.1) Research Data

Data used in this research includes:

a) weekly returns of Type A and Type B funds

b) weekly returns on T-Bills

c) weekly returns on Istanbul Stock Exchange 100 index(ISE-100)

over the analysis period.

Weekend prices of all existing funds(55 Type A, and 77 Type B Funds) were obtained from Capital Markets Board (CMB) statistics, and the weekly returns were calculated thereupon. Type A funds are those which include a stocks component of minimum 25 %. Type B funds, on the other hand, are various combinations of T-Bills, Repos and other low-risk instruments.

Weekly returns on Turkish T-Bills were calculated based on the T-Bill prices obtained from ISE taking the days to maturity into consideration. The resulting figure, therefore, is an overall average of the returns of all outstanding T-Bills of different maturities.

Weekly returns on İSE-100 index, on the other hand, were calculated based on the index values obtained from Metastock database.

Averages, standard deviations, and beta coefficients of weekly portfolio returns, T-Bill rates and ISE-100 index were calculated for the entire period as well as the sub-periods of 1998, 1999, and first half of 2000. Dividends were ignored in beta calculations.

Appendix A is the compilation of the data used in the research.

2.2) Research Methodology

Treynor, Sharpe, Jensen and Graham-Harvey indices were calculated for each "Type A" and "Type B" fund as well as the ISE-100 index, based on the formulas and explanations given in I above. Then, the portfolios were ranked according to their performance indicators.

In order to test whether the four different methods rank the portfolios similarly, Spearman rank correlation coefficients were calculated for each pair of ranking criteria.

In order to compare portfolio performances of Type A and Type B funds with those of T-Bills , and ISE-100, average Sharpe coefficients of Type A and Type B funds and ISE-100 index were compared and the statistical significance of the differences were tested with Wilcoxon Signed-Rank Test.

2.3) Research Findings

2.3.1) Risk Premiums

Figure 1 depicts the behaviour of average weekly risk premiums ($R_j - R_f$) on Type A funds, Type B funds and the ISE-100 index. Under normal capital market conditions these risk premiums would always be expected to be positive. But, this was not the case in Turkey over the analysis period. Negative risk premiums mean that T-Bills were a better investment than the other three instruments in almost half of the observation periods. This is obviously the financial market implication of unfavourable macroeconomic conditions prevailing in Turkey over those years.

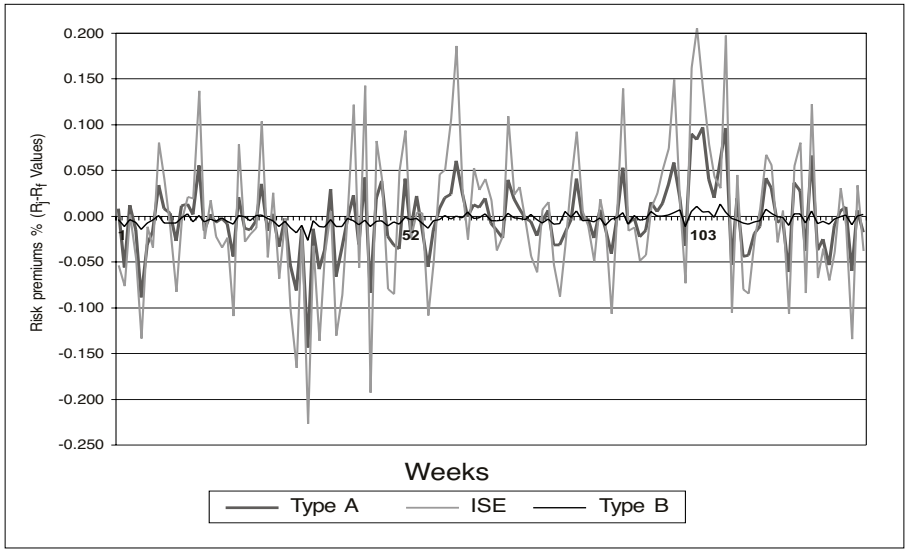

Figure 1
Risk Premiums

Figure 1 permits us to make following observations as well:

a) Type B funds were not a good investment at all. Their average risk premium was negative, but their variation was greater than zero.
b) Type A funds were successful in reducing the portfolio risk below the market risk. However their risk premiums were below the market risk premium. Therefore the rationale of Type A funds can be commented upon only after evaluating them against ISE index with the criteria defined in I. This will be done below.
c) Type A funds have provided higher risk premiums than Type B funds as expected.

2.3.2) Portfolio Rankings

Type A and Type B funds were ranked according to Sharpe, Treynor, Jensen, and Graham&Harvey criteria, and Spearman rank correlation coefficients were calculated for each pair of indices. The results are summarized in Table 1.

In Type A funds , the calculated "Spearman r"s for the entire period as well as the three sub-periods are quite high and significant at 1% α level. This means that index used in evaluating Type A funds does not matter.

In Type B funds Spearman rank correlation coefficients are much lower. But they are still significant at 1% α level in 18 cases, at 5 % α level in 3 cases, and at 10 %α level in 1 case. Only in two cases in Year 1999, r was found insignificant.

Table 1

Results of "Spearman R" Correlation Analysis

		Type A Funds		**Type B Funds**	
		Spearman R	**T Value**	**Spearman R**	**T Value**
Entire Period	S & T	0.8826	13.80 ***	0.4141	3.94 ***
	S & J	0.9372	19.74 ***	0.4754	4.68 ***
	S & GH	0.9494	22.22 ***	0.5052	5.07 ***
	T & J	0.8906	14.39 ***	0.3017	2.74 ***
	T & GH	0.8891	14.28 ***	0.2834	2.56 **
	J & GH	0.9921	58.01 ***	0.9959	95.33 ***
1998	S & T	0.9285	18.38 ***	0.8107	11.99 ***
	S & J	0.7624	8.66 ***	0.2252	2.00 **
	S & GH	0.9640	26.66 ***	0.6578	8.00 ***
	T & J	0.8451	11.62 ***	0.2902	2.63 **
	T & GH	0.9118	16.32 ***	0.5560	5.79 ***
	J & GH	0.8234	10.66 ***	0.7554	9.98 ***
1999	S & T	0.9380	19.89 ***	0.0052	0.04
	S & J	0.9336	19.15 ***	0.4281	4.10 ***
	S & GH	0.9452	21.27 ***	0.075	0.65
	T & J	0.9714	30.04 ***	0.5288	5.40 ***
	T & GH	0.8343	11.12 ***	0.4818	4.76 ***
	J & GH	0.8612	12.45 ***	0.7413	9.56 ***

Table 1 (cont.)

		Type A Funds		Type B Funds	
		Spearman R	T Value	Spearman R	T Value
2000/I	S & T	0.9976	106.04 ***	0.2005	1.77 *
	S & J	0.9304	18.66 ***	0.6095	6.66 ***
	S & GH	0.9711	29.89 ***	0.7094	8.82 ***
	T & J	0.9303	18.64 ***	0.3339	3.07 ***
	T & GH	0.9710	29.82 ***	0.3568	3.31 ***
	J & GH	0.9714	30.08 ***	0.9122	19.28 ***

, **, *** indicates significance at 10, 5, 1% significance level respectively using two-tailed test.

2.3.3) Comparison of Sharpe Indices

Having seen that it is highly correlated with other indices , and given the fact that it measures the success in diversification as well, the Sharpe index was chosen to compare the performances of alternative investment media included in the research.

Weekly Sharpe indices of T-Bills, Type A Funds, Type B Funds and ISE-100 index are graphed in Figure 2. Sharpe index for T-Bills is zero by definition, and coincides with X axis. For other instruments, a negative Sharpe index means that return on the instrument is less than T-Bill rate. Figure 2 indicates that there are as many negative Sharpe indices as positive ones, and this is against the expectation.

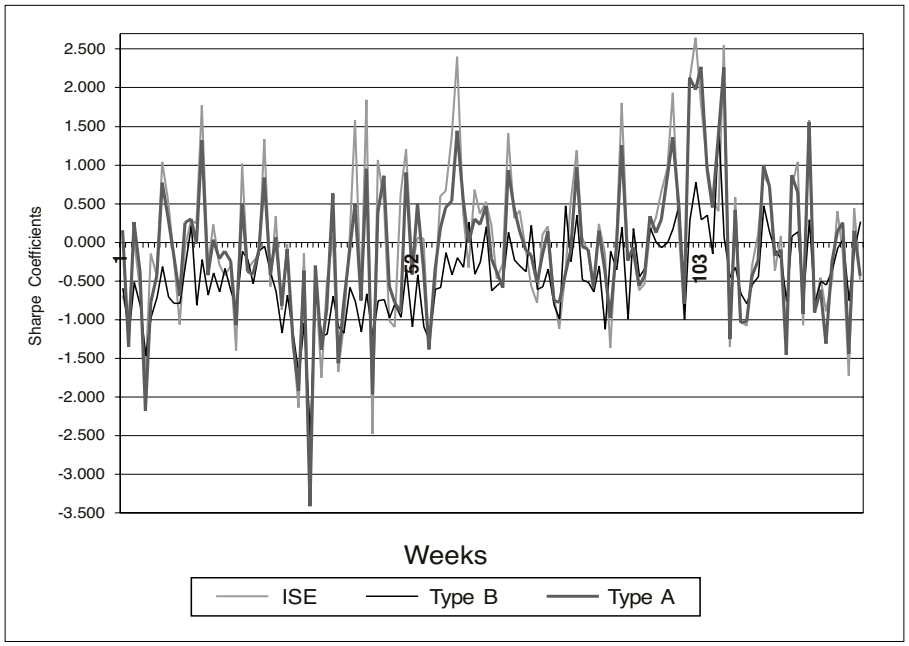

Figure 2

Sharpe Coefficients

Averages of weekly Sharpe indices of the four categories are given in Table 2.

Table 2

Average Sharpe Index

	Entire Period	**1998**	**1999**	**2000/I**
T-Bills	0	0	0	0
ISE-100 Index	-0.02	-0.29	0.27	-0.11
Type A Funds	-0.45	-0.77	-0.23	-0.27
Type B Funds	-0.09	-0.36	0.20	-0.15

According to Table 2, for the entire period as well as the years 1998 and 2000/I, T-Bill was the best investment, followed by ISE-100 index, Type B funds and Type A funds respectively. Only in 1999, performances of ISE-100 and Type B funds were superior to T-Bill. The sign and rank of Type A funds, however, remained to be same.

Table 3 shows the number of Type A funds with Sharpe coefficients greater than that of ISE-100 index. The figures on the diagonal of the matrix represents the total number of Type-A funds that exceeded ISE-100 in Sharpe coefficient. Other figures in the same row tells us how many of them were better than ISE-100 in other periods as well. For example in the entire period 7 Type A funds performed better than ISE-100. Of this 7, 2 in 1998, 4 in 1999, 6 in 2000/I also outperformed ISE-100.

Table 3

Number of Type A funds That Performed Better Than ISE-100

	Entire Period	**1998**	**1999**	**2000/I**
Entire Period	**7**	**2**	**4**	**6**
1998	**2**	**6**	**1**	**3**
1999	**4**	**1**	**9**	**7**
2000/I	**6**	**3**	**7**	***24***

Table 3 figures are not promising with respect to the performance of Type A funds.

Table 4, on the other hand, provides information on Type B funds which outperformed T-Bills:

Table 4

Number of Type B Funds That Performed Better Than T-Bills

	Entire Period	1998	1999	2000/I
Entire Period	**3**	0	2	2
1998	0	**0**	0	0
1999	2	0	**14**	3
2000/1	2	0	3	**5**

Table 4 is a reflection of poor performance of Type B funds over the analysis period as well as in the sub-periods.

In order to see whether the average Sharpe indices of the four investment alternatives given in Table-2 were significantly different from each other, the standard Z test was applied to the calculated Wilcoxon's W statistics. The findings are summarized in Table – 5 .

Table 5

Z Test Results For The Significance of Sharpe Index Mean Differences

		ISE-100 / T-Bill	Type A / T-Bill	Type B / T-Bill	Type A / ISE-100	Type B/ ISE-100	Type A / Type B
Entire	Mean Difference	- 0.02	-0.45	-0.09	-0.43	-0.07	-0.36
	Z-Statistics	0.57	7.85***	1.26	5.56***	1.84*	6.1***
1988	Mean Difference	-0.29	-0.77	-0.36	-0.48	-0.07	-0.41
	Z-Statistics	2.05**	6.24***	2.62***	3.88***	0.80	4.30***
1999	Mean Difference	0.27	-0.23	0.20	-0.50	-0.07	-0.43
	Z-Statistics	1.74*	3.40***	1.35	4.07***	1.51	4.78***
2000/I	Mean Difference	-0.11	-0.27	-0.15	-0.16	-0.04	-0.12
	Z-Statistics	0.82	2.79***	1.04	0.82	0.93	0.58

****, **, *** indicates significance at 10, 5, 1% significance level respectively using two-tailed test.***

Table 5 permits the following comments:

a) For the entire analysis period, and in Years 1988 and 1999 the differences between the Sharpe coefficients are statistically significant. This means that performance ranking in Table 2, which is against the expectations under normal capital market conditions, is dependable. Only two observations, both in 1999, are in line with expectations of capital market theory: In that year ISE-100 performed better than Type B funds, and Type B funds better than T-Bills. However the differences between Type B funds, T-Bills and ISE-100 index and Type B funds were not found to be statistically significant. The difference between ISE-100 and T-Bills, on the other hand, is significant at 10% α level.

b) Table-2 ranking is valid in 2000 as well, but Z-values are insignificant except the one pertaining to Type A funds- T-Bills difference.

III. CONCLUSION

Portfolio performances of Type A and Type B funds were measured by the methods suggested by Sharpe, Treynor, Jensen, and Graham&Harvey . Using Spearman Rank Correlation Test it was found that these methods rank Type A funds in the same manner. In Type B funds rank correlation coefficients were lower, but still statistically significant.

Relative performances of T-Bills, Type B funds, ISE-100 index and Type A funds were measured through the Sharpe index. It was found that, over the entire analysis period as well as in the three sub-periods T-Bills were the best investment. It was followed by ISE-100 index, Type B funds and Type A funds respectively. The dependability of this ranking was tested through standard Z test applied to Wilcoxon Signed-Rank Test Statistic calculated for each pair of investment media included in the analysis over the entire period and for each of the sub-periods. Z test gave supportive results.

Therefore, it was concluded that the efforts to form Type A and Type B funds in expectation of reaching superior performance to T-Bills, and ISE-100 index totally failed over the analysis period. This is interpreted as the financial market implication of adverse macroeconomic conditions prevailing in the country during the same period.

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Appendix A

Research Data

	1998			1999			2000			Entire Period		
	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta
Treasury Fund	0.018	0.003	0.000	0.015	0.002	-0.004	0.008	0.001	0.002	0.015	0.005	-0.001
ISE-100 Index	-0.004	0.080	1.000	0.036	0.071	1.000	0.001	0.078	1.000	0.013	0.078	1.000
Type A Funds												
ABN Amro A. Alarko Special	0.010	0.025	0.286	0.020	0.021	0.273	0.009	0.035	0.423	0.014	0.027	0.308
ABN Amro A. Alarko Mixed	0.007	0.037	0.412	0.021	0.036	0.436	0.005	0.046	0.529	0.012	0.039	0.441
Alternatifbank A. Variable	0.003	0.038	0.399	0.021	0.033	0.357	0.003	0.044	0.483	0.010	0.038	0.406
Ata Yatırım A. Mixed	0.007	0.035	0.401	0.022	0.028	0.357	0.004	0.027	0.310	0.012	0.032	0.370
Ata Yatırım A. Stock	0.001	0.063	0.730	0.031	0.057	0.765	0.002	0.070	0.824	0.013	0.064	0.763
Bank Ekspres A. Variable	0.005	0.044	0.383	0.026	0.032	0.376	0.008	0.097	0.800	0.014	0.055	0.469
Commercial Union. A. Variable	0.008	0.039	0.364	0.026	0.035	0.386	0.008	0.037	0.428	0.015	0.038	0.390
Demir Yatirim. A. Variable	0.007	0.048	0.501	0.032	0.054	0.701	0.006	0.062	0.739	0.017	0.054	0.623
Demirbank. A. Variable	0.004	0.045	0.462	0.030	0.050	0.653	0.006	0.063	0.728	0.015	0.052	0.589
Eczacibasi Men.Deg. A. Variable	0.013	0.023	0.242	0.028	0.043	0.543	0.011	0.042	0.455	0.019	0.037	0.394
Eczacibasi AXA. A. Variable	0.002	0.011	0.032	0.004	0.009	0.004	0.003	0.007	-0.002	0.003	0.010	0.018
EGS Bank. A. Mixed	0.005	0.038	0.432	0.022	0.034	0.404	0.004	0.036	0.424	0.012	0.037	0.421
Esbank A. Variable	-0.002	0.087	0.766	0.009	0.035	0.366	0.000	0.051	0.577	0.003	0.063	0.566
Finansbank. A. Variable	0.004	0.032	0.324	0.018	0.022	0.282	0.000	0.060	0.660	0.009	0.037	0.380
Garanti Bankası. A. Mixed	0.010	0.025	0.274	0.020	0.024	0.295	0.005	0.025	0.290	0.013	0.025	0.286
Garanti Bankası. A. Variable	0.002	0.041	0.394	0.023	0.035	0.443	0.005	0.042	0.508	0.011	0.040	0.440
Global Men. Deg. A. Variable	0.012	0.039	0.375	0.028	0.061	0.511	0.009	0.030	0.362	0.018	0.048	0.421
Hak Menkul Kiy. A. Variable	0.003	0.035	0.369	0.018	0.023	0.268	0.005	0.042	0.480	0.010	0.033	0.357
Halkbank. A. Mixed	0.008	0.034	0.297	0.021	0.029	0.352	0.001	0.034	0.375	0.012	0.033	0.336
Iktisat Bankasi. A. Variable	0.000	0.155	0.610	0.017	0.037	0.389	0.004	0.042	0.488	0.008	0.102	0.502
Interbank A.Ş. A. Variable	0.008	0.024	0.268	0.028	0.036	0.432	0.001	0.040	0.472	0.015	0.035	0.379
Interbank A.Ş. A. Mixed	0.010	0.027	0.281	0.032	0.065	0.321	0.000	0.043	0.407	0.017	0.036	0.396
Inter Yatirim Men.Deg. A. Stock	0.005	0.044	0.491	0.029	0.049	0.477	0.001	0.048	0.589	0.014	0.048	0.515
İş Bankası. A. Owner. Interest	-0.001	0.051	0.568	0.029	0.049	0.552	0.002	0.056	0.657	0.011	0.053	0.591

Appendix A (cont.)

	1998			1999			2000			Entire Period		
	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta
İş Bankası. A. Stock	-0.003	0.043	0.465	0.027	0.041	0.514	-0.003	0.041	0.437	0.009	0.044	0.495
İş Bankası. A. Variable	0.007	0.027	0.309	0.022	0.028	0.366	0.004	0.037	0.428	0.012	0.031	0.357
İs Yatırım. A. Variable	0.007	0.027	0.302	0.024	0.032	0.411	0.006	0.040	0.480	0.014	0.033	0.381
Kapital. A. Variable	0.003	0.040	0.355	0.022	0.042	0.426	0.002	0.081	0.936	0.010	0.052	0.500
Koç Allianz. A. Insurance	0.005	0.031	0.197	0.024	0.026	0.305	0.008	0.052	0.642	0.013	0.035	0.336
Koçbank. A. Stock	0.000	0.046	0.483	0.029	0.043	0.555	0.000	0.059	0.700	0.012	0.049	0.564
Koçbank. A. Variable	0.004	0.034	0.380	0.022	0.030	0.375	0.005	0.030	0.357	0.012	0.032	0.378
Nurol Men. Kıy. A. Variable	0.007	0.031	0.333	0.023	0.045	0.485	0.008	0.036	0.391	0.014	0.039	0.400
Osmanlı Bankası. A. Mixed	0.008	0.025	0.282	0.019	0.023	0.310	0.004	0.026	0.312	0.012	0.025	0.299
Strateji Men. Deg. A. Variable	0.009	0.026	0.293	0.030	0.043	0.486	0.006	0.067	0.807	0.017	0.045	0.473
Sümerbank. A. Mixed	0.004	0.045	0.465	0.023	0.025	0.307	0.001	0.039	0.459	0.011	0.038	0.414
Tacirler Men. Değ. AŞ. A. Mixed	0.005	0.041	0.432	0.018	0.025	0.294	0.007	0.038	0.398	0.011	0.035	0.373
TEB A. Variable	0.009	0.030	0.328	0.021	0.024	0.310	0.003	0.033	0.391	0.013	0.029	0.336
TEB. A. Mixed	0.005	0.038	0.415	0.024	0.032	0.397	0.006	0.044	0.523	0.013	0.038	0.435
TEB Yatırım A. Variable	0.009	0.028	0.312	0.021	0.022	0.272	0.005	0.030	0.359	0.013	0.027	0.310
Tekfen Yat. Fin. Bank. A. Variable	0.002	0.053	0.544	0.019	0.021	0.217	0.004	0.025	0.298	0.009	0.038	0.380
Tekstilbank. A. Stock	-0.004	0.046	0.479	0.024	0.046	0.517	0.005	0.062	0.718	0.009	0.051	0.548
Toprakbank A. Variable	0.007	0.035	0.374	0.020	0.029	0.358	0.004	0.029	0.353	0.012	0.032	0.363
Türk Dış.Tic.Bank.A. Variable	0.006	0.036	0.371	0.019	0.020	0.251	0.004	0.023	0.270	0.011	0.029	0.310
Türk Dış.Tic.Bank.A. Mixed	0.006	0.040	0.404	0.020	0.022	0.279	0.004	0.021	0.256	0.011	0.031	0.333
Türkiye Kalkınma Ba. A. Variable	0.002	0.038	0.435	0.019	0.025	0.308	0.003	0.030	0.345	0.009	0.033	0.375
Vakıflar Bankası. A. Stock	0.001	0.063	0.706	0.031	0.054	0.691	-0.001	0.062	0.765	0.013	0.061	0.718
Yapı Kredi Men. Deg. A. Textile	-0.007	0.058	0.599	0.021	0.045	0.493	0.006	0.058	0.568	0.007	0.054	0.560
Yapı Kredi Men. Deg. A. Metal	-0.006	0.069	0.779	0.034	0.058	0.710	0.013	0.071	0.832	0.014	0.067	0.774
Yapı Kredi Men. Deg. A. Fin.	0.002	0.083	0.952	0.033	0.063	0.837	-0.001	0.072	0.896	0.014	0.075	0.894
Yapı Kredi Men. Deg. A. Food	0.006	0.065	0.676	0.020	0.042	0.416	0.009	0.054	0.569	0.012	0.054	0.550
Yapı Kredi Men. Deg. A. Stock	-0.003	0.074	0.862	0.027	0.045	0.566	0.006	0.052	0.636	0.011	0.061	0.711
Yapı Kredi Yatırım. A. Insurance	0.007	0.034	0.358	0.029	0.043	0.584	0.006	0.055	0.649	0.015	0.044	0.503
Yaşarbank. A. Variable	-0.002	0.049	0.491	0.019	0.030	0.339	0.003	0.039	0.449	0.008	0.041	0.434
Yatırım Finansman A. Variable	0.007	0.024	0.281	0.023	0.031	0.395	0.001	0.043	0.502	0.012	0.032	0.371

Appendix A (cont.)

	1998			1999			2000			Entire Period		
	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta
Ziraat Bankasi. A. Variable	0.005	0.036	0.381	0.020	0.027	0.337	0.006	0.038	0.462	0.011	0.034	0.382
TYPE B Funds												
ABN Amro B. Variable	0.010	0.013	0.094	0.013	0.008	0.084	0.007	0.008	0.060	0.011	0.011	0.085
Akbank B. Bond	0.013	0.010	0.026	0.014	0.005	0.020	0.005	0.004	0.029	0.012	0.008	0.027
Akbank B. Variable	0.014	0.075	0.072	0.013	0.003	-0.002	0.006	0.002	0.006	0.012	0.047	0.033
Alfa Menkul Değ. B. Variable	0.012	0.011	0.058	0.014	0.006	0.014	0.005	0.023	0.165	0.012	0.013	0.066
Alternatifbank B. Foreign Sec.	0.009	0.011	0.034	0.010	0.013	0.047	0.007	0.012	0.018	0.009	0.012	0.035
Alternatifbank B. Variable	0.008	0.015	0.052	0.013	0.007	0.025	0.006	0.008	0.058	0.010	0.011	0.048
Ata Yatırım B. Bond	0.012	0.010	0.083	0.013	0.009	0.050	0.005	0.019	0.033	0.011	0.012	0.063
Bank Ekspres B. Variable	0.011	0.011	0.049	0.013	0.007	0.035	0.005	0.047	0.339	0.011	0.022	0.104
Bayındır Men. Deg. B. Variable	0.013	0.009	0.021	0.013	0.005	0.000	0.007	0.004	0.022	0.012	0.007	0.015
Demir Yat.Men.Deg. B. Variable	0.013	0.009	0.033	0.019	0.029	0.214	0.007	0.008	0.050	0.014	0.020	0.105
Demirbank B. Variable	0.012	0.008	0.022	0.016	0.024	0.168	0.005	0.016	0.172	0.012	0.018	0.107
Eczacibasi Men. Deg. B. Variable	0.013	0.004	0.016	0.013	0.005	0.010	0.006	0.006	0.024	0.012	0.006	0.018
Egebank. B. Variable	0.012	0.007	0.037	0.014	0.006	0.016	0.005	0.006	0.013	0.011	0.007	0.028
EGS Bank. B. Variable	0.013	0.016	0.125	0.015	0.013	0.068	0.005	0.015	0.170	0.012	0.015	0.114
Ekinciler Yatirim; B; Variable	0.010	0.009	0.067	0.015	0.010	0.050	0.008	0.007	0.051	0.012	0.010	0.063
Emlak Bankasi. B. Variable	0.014	0.011	0.078	0.017	0.011	0.057	0.007	0.008	0.076	0.014	0.011	0.074
Emlak Bankasi. B. Liquid	0.014	0.003	0.008	0.015	0.005	-0.010	0.006	0.002	0.003	0.013	0.005	0.005
Emlakbank. B. Bond	0.015	0.008	0.034	0.016	0.005	0.011	0.007	0.007	0.027	0.014	0.007	0.027
Esbank B. Variable	0.005	0.023	0.217	0.012	0.009	0.082	0.002	0.027	0.286	0.007	0.020	0.185
Esbank. B. Liquid	0.006	0.040	0.333	0.014	0.011	0.048	0.005	0.004	-0.013	0.009	0.026	0.163
Finansbank. B. Bond	0.014	0.036	-0.045	0.013	0.011	0.052	0.007	0.006	0.050	0.012	0.024	0.011
Finansbank. B. Liquid	0.013	0.002	0.002	0.013	0.003	-0.008	0.006	0.004	-0.001	0.011	0.004	0.001
Finansbank. B. Variable	0.015	0.016	-0.013	0.015	0.011	0.053	0.007	0.009	0.067	0.014	0.013	0.029
Garanti Bankası. B. Bond	0.013	0.007	0.044	0.012	0.011	0.064	0.005	0.007	0.052	0.011	0.009	0.051
Garanti Bankası. B. Liquid	0.013	0.002	0.002	0.013	0.003	-0.005	0.006	0.004	0.000	0.012	0.004	0.002
Garanti Bankası. B. Variable	0.011	0.005	0.023	0.013	0.003	-0.005	0.006	0.004	0.001	0.011	0.005	0.012
Garanti Men. Kıy. B. Variable	0.012	0.005	0.016	0.011	0.007	0.028	0.006	0.004	-0.001	0.010	0.006	0.016
Halkbank. B. Bond	0.009	0.018	0.164	0.016	0.012	0.127	0.001	0.019	0.154	0.010	0.017	0.154

Appendix A (cont.)

	1998			1999			2000			Entire Period		
	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta
Halkbank. B. Variable	0.010	0.015	0.106	0.014	0.009	0.101	0.003	0.072	-0.112	0.011	0.034	0.065
Iktisat Bankasi. B.Variable	0.010	0.008	0.035	0.001	0.001	0.002	0.007	0.005	0.010	0.006	0.007	0.004
Iktisat Bankasi. B. Bond	0.011	0.010	0.060	0.010	0.010	0.043	0.005	0.012	0.099	0.009	0.010	0.059
Interbank A.Ş. B. Liquid	0.013	0.004	0.003	0.013	0.003	-0.004	0.006	0.002	-0.001	0.011	0.004	0.003
Interbank A.Ş. B. Variable	0.012	0.007	0.033	0.016	0.019	0.103	0.006	0.006	0.049	0.013	0.014	0.065
İsviçre Sig. B. Bond	0.014	0.008	0.034	0.013	0.009	0.034	0.006	0.005	0.021	0.012	0.008	0.032
İş Bankası. B. Foreign Sec.	0.009	0.006	0.017	0.011	0.007	0.033	0.003	0.018	0.028	0.009	0.010	0.029
İş Bankası. B. Bond	0.012	0.005	0.034	0.014	0.006	0.041	0.006	0.005	0.020	0.012	0.006	0.036
İş Bankası. B. Liquid	0.013	0.002	0.010	0.013	0.004	0.009	0.006	0.004	0.005	0.011	0.004	0.011
Kapital. B. Variable	0.014	0.013	0.032	0.015	0.006	0.020	0.004	0.010	0.078	0.012	0.011	0.446
Koçbank B. Variable	0.012	0.005	0.031	0.012	0.008	0.040	0.005	0.006	0.029	0.011	0.007	0.036
Koçbank. B. Bond	0.017	0.012	-0.016	0.018	0.013	0.035	0.008	0.006	0.048	0.016	0.012	0.041
Körfezbank. B. Variable	0.013	0.003	0.008	0.015	0.010	0.031	0.012	0.008	0.029	0.014	0.007	-0.032
Osmanlı Bankası. B. Bond	0.013	0.005	0.026	0.011	0.013	0.098	0.005	0.006	0.052	0.010	0.010	0.062
OyakBank. B.Variable	0.012	0.006	0.038	0.013	0.003	-0.002	0.006	0.004	0.030	0.011	0.005	0.175
Pamukbank. B. Liquid	0.013	0.002	0.001	0.013	0.003	-0.005	0.007	0.004	0.000	0.012	0.004	0.061
Sınai Yatırım. B. Variable	0.013	0.007	0.056	0.017	0.009	0.075	0.010	0.011	0.094	0.014	0.009	0.356
Sümerbank. B. Variable	0.009	0.020	0.156	0.018	0.007	0.038	0.007	0.014	0.146	0.012	0.016	1.387
Sümerbank. B. Liquid	0.013	0.002	0.001	0.013	0.003	-0.003	0.006	0.004	0.000	0.012	0.004	0.542
Sümerbank. B. Bond	0.011	0.012	0.094	0.019	0.012	0.051	0.009	0.010	0.044	0.014	0.012	1.283
Şekerbank. B. Variable	0.011	0.007	0.050	0.013	0.004	0.006	0.007	0.005	0.008	0.011	0.006	0.739
Tacirler Men. Değ. B. Variable	0.014	0.008	0.029	0.020	0.021	0.184	0.002	0.030	0.304	0.014	0.020	1.200
Taib. B. Variable	0.010	0.016	0.063	0.016	0.012	0.089	0.006	0.015	0.137	0.012	0.015	0.749
Tarişbank. B. Variable	0.012	0.006	0.007	0.013	0.005	-0.003	0.007	0.004	-0.003	0.012	0.006	0.806
Tarişbank. B. Liquid	0.014	0.004	0.000	0.013	0.003	0.000	0.007	0.003	-0.003	0.012	0.004	0.798
TEB B. Variable	0.013	0.005	0.038	0.013	0.005	0.024	0.005	0.007	0.050	0.011	0.006	0.957
TSKB. B. Bond	0.007	0.022	0.201	0.012	0.025	0.001	0.002	0.008	0.049	0.008	0.022	0.250
Tekstilbank. B. Liquid	0.012	0.003	0.000	0.012	0.005	-0.010	0.006	0.002	-0.006	0.011	0.005	0.022
Tekstilbank. B. Variable	0.012	0.004	0.006	0.015	0.011	0.083	0.005	0.008	0.045	0.012	0.009	0.049
Toprakbank B. Variable	0.012	0.005	0.029	0.014	0.002	-0.001	0.007	0.005	0.002	0.012	0.005	0.045

Appendix A (cont.)

	1998			1999			2000			Entire Period		
	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta	Return	StdDev	Beta
TSKB. B. Variable	0.014	0.003	0.010	0.015	0.041	0.024	0.005	0.010	0.096	0.012	0.027	0.145
Türk Dış.Tic.Bank.B. Variable	0.013	0.003	0.015	0.013	0.003	-0.001	0.006	0.004	0.013	0.012	0.005	0.526
Türkiye Kalkınma B. Variable	0.012	0.005	0.042	0.015	0.008	0.084	0.006	0.014	0.150	0.012	0.009	0.616
Vakıflar Bankası. B. Foreign Sec.	0.010	0.005	0.001	0.012	0.013	0.079	0.003	0.019	0.153	0.010	0.012	0.220
Vakıflar Bankası. B. Bond	0.012	0.014	0.102	0.013	0.008	0.069	0.005	0.011	0.104	0.011	0.012	0.675
Vakıflar Bankası. B. Liquid	0.013	0.002	0.002	0.013	0.003	-0.001	0.006	0.002	-0.004	0.012	0.003	0.098
Vakıflar Bankası. B. Mixed	0.011	0.011	0.093	0.016	0.017	0.206	0.005	0.017	0.200	0.012	0.016	0.732
Vakıflar Bankası. B. Variable	0.012	0.009	0.077	0.013	0.006	0.037	0.006	0.002	0.000	0.011	0.008	0.399
Yapı Kredi Men. Deg. B. Bond	0.012	0.011	0.086	0.012	0.051	-0.003	-0.003	0.028	0.259	0.009	0.036	0.521
Yapı Kredi B. Variable	0.009	0.015	0.096	0.012	0.008	0.035	0.003	0.013	0.094	0.009	0.013	0.186
Yapı Kredi B. Foreign Sec.	0.008	0.057	0.198	0.009	0.024	0.094	0.004	0.021	0.004	0.008	0.040	0.106
Yapı Kredi B. Liquid	0.013	0.003	0.001	0.013	0.003	-0.003	0.006	0.002	-0.005	0.012	0.004	0.036
Yapı Kredi B. Bond	0.011	0.012	0.094	0.013	0.011	0.064	0.004	0.015	0.086	0.010	0.013	0.322
Yaşarbank. B. Liquid	0.013	0.002	0.003	0.013	0.003	-0.002	0.005	0.002	-0.008	0.011	0.004	0.039
Yaşarbank. B. Variable	0.011	0.010	0.032	0.013	0.005	-0.007	0.005	0.003	0.012	0.011	0.007	0.058
Yatırım Finansman B. Variable	0.008	0.030	0.026	0.013	0.003	0.010	0.006	0.002	0.001	0.010	0.019	0.058
Ziraat B Variable	0.014	0.005	0.033	0.014	0.015	0.049	0.006	0.013	0.124	0.012	0.012	0.225
Ziraat B. Liquid	0.013	0.002	0.006	0.013	0.003	-0.003	0.006	0.003	-0.001	0.012	0.004	0.103
Ziraat Bankası. B. Bond	0.013	0.006	0.046	0.014	0.007	0.042	0.006	0.006	0.040	0.012	0.007	0.215